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Materials Management Office  
1201 Main Street, Suite 600  
Columbia, South Carolina 29201

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## **STATEWIDE TERM CONTRACT**

### **FOR TESTING ADJUSTING & BALANCING SERVICES**

**CONTRACT PERIOD:**    **Initial Term:**            **June 12, 2012 through June 11, 2011**  
                                 **Maximum Term:**        **June 12, 2012 through June 11, 2016**

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#### **SCOPE OF WORK**

Needs that may be fulfilled by this contract are as follows:

- Measurement and verification of HVAC system performance, with required reports
- Restoration of HVAC systems to original, as built, performance parameters
- Rebalance HVAC systems to accommodate new requirements, due to:
  - reconfiguration of existing space,
  - change in use of space,
  - replacement of existing equipment,
  - updating outside air requirements,
  - updating control sequences,
  - changing exhaust systems,
  - small, in-house, or IDC projects involving HVAC
  - periodic mandated performance certification,
  - other ancillary work
- Measurement of Vibration
- Measurement of Sound

#### **COSTS**

Bases for the TAB services fees will be a combination of:

TAB worker hours

Expenses incurred:

- Travel and or per diem
- Specialized equipment rental (lifts or scaffolding)
- Unspecified miscellaneous work (negotiated hourly rate) not to exceed 10% of total cost
- Materials (belts, sheaves, etc)

Contractors must agree to pricing limits for hourly rates for TAB Manager/Supervisor, TAB Technician, TAB Technician Assistant, and Clerical as follows. Adjustments may be made at contract renewal.

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TAB MRGR: \$/Hr. 85  
TAB Tech: \$/Hr. 65  
TAB Tech Asst: \$/Hr. 45  
Clerical: \$/Hr. 45

## **TYPICAL SEQUENCE**

The TAB Consultant will respond to the representative of a qualified Agency requesting TAB service, to determine a preliminary scope of work including;

- purpose of work (desired outcome);
- expected duration of work;
- types and quantity of HVAC system components involved;
- type of control system involved;
- availability of documentation for the HVAC system;
- type areas being served;
- accessibility issues;
- status of systems readiness (state of repair).

Once these and any other TAB issues have been addressed, the contractor may provide a budget estimate and expected duration for TAB work.

If the Agency opts to continue (note that the Agency may contact other TAB consultants prior to issuing a PO), the TAB consultant will then:

- coordinate a site visit to refine the scope of work if required, and
- establish contact with Agency personnel who will provide access to the work areas as needed
- determine needs for HVAC controls personnel and data as needed
- coordinate with fire and safety personnel as needed, and
- determine occupancy requirements during TAB work with the project manager or designee

TAB work will not interfere with or violate Agency requirements.

Once the work environment and equipment is adequately familiar to the contractor and the Agency representative has effected the necessary coordination and is in agreement with the cost and scope of work then the contractor may proceed once the work order is processed.

## **REIMBURSABLE EXPENSES:**

Reimbursable Expenses are travel, lodging and meal expenses related to requested TAB services. Lodging and meal expenses shall only be reimbursed when the site of inspection is more than 100 miles of travel from the closer of the service provider's home or office. Mileage shall be calculated from the Consultant's office to the site of work and back. If the Consultant has more than one office, mileage shall be calculated using the office nearest to the site of work. Mileage, lodging and meal compensation shall be at rates established by the State of South Carolina for State Employees

Where service provider(s) or technician(s) perform multiple services or tests during the same trip, Owner shall reimburse Consultant for the mileage of only one trip.

## **PROGRESS PAYMENT**

Owner shall pay Consultant as the work progresses, but not more than once each month after the date of Notice to Proceed and only upon receipt of an invoice containing sufficient detail to justify the amount of payment requested.

## **CONSULTANT DUTIES**

### **GENERAL**

Consultant acknowledges and accepts the relationship of trust and confidence between the State and the Consultant by this Agreement. Consultant further acknowledges the reliance that the Owner may place on its skill and judgment. Consultant covenants to furnish its best skill and judgment and to cooperate with the Owner. Consultant shall perform all services in accordance with the applicable best practices and technical standards.

Consultant shall designate a representative authorized to act on behalf of the Consultant in all matters related to the Consultant's performance under this Agreement. This representative is to be an AABC certified Test, Adjust and Balance Engineer (TBE) or a NEBB certified professional in Testing Adjusting and Balancing. Consultant shall not replace the designated representative without prior approval of the procurement officer.

Consultant shall have, prior to accepting a purchase order for TAB services, copies of all standards applicable to the performance of the specific TAB services required by the purchase order.

Consultant shall be entitled to rely on the accuracy of information furnished by an Owner, provided that the Consultant shall review all such information and shall give prompt and timely notice to the Owner of deficiencies or inconsistencies in the information furnished.

### **DISCIPLINE AND COMPETENCE**

Consultant shall perform its responsibilities in a competent manner and as expeditiously as possible. The Consultant shall enforce strict discipline and good order among the Consultant's employees, its sub-consultants, agents, representatives and other persons performing under this Agreement. Consultant shall not permit employment of unfit persons or persons not certified and skilled in tasks assigned to them. Consultant and sub-consultants shall always conduct themselves in a workmanlike and courteous manner. Methods of intimidation, anger, or other unacceptable conduct will be grounds for termination of this Agreement or debarment of the offending individual from working on state projects at the discretion of the procurement officer.

## TAB SERVICES

a. Consultant shall be certified by either AABC or NEBB to perform TAB service for HVAC, water balancing and sound and vibration testing (measurement only) of equipment and systems. Consultant shall perform in accordance with the requirements and standards of the TAB agency under which the Consultant is certified. Consultant shall maintain certification for the duration of the contract. If Consultant ceases to be certified, the Consultant shall immediately notify the procurement officer and cease providing TAB services under this contract.

b. All technicians performing actual TAB work shall be certified by AABC or NEBB and work directly under an AABC certified TBE or a NEBB certified Professional. The Consultant shall maintain records that verify the certifications of its technicians used for services. These records will be available for review by the State at anytime during the life of the contract and for one (1) year thereafter.

c. All TAB services shall be provided under the supervision of a TAB specialist. The TAB specialist shall be an or AABC certified Testing and Balancing Engineer or NEBB Certified Professional. The TAB specialist shall sign and stamp the TAB reports that bear the seal of the TAB standard. The reports shall be accompanied by report forms and schematic drawings required by the TAB standard, AABC or NEBB. The TAB specialist will follow all TAB work through to satisfactory completion. Following approval of the TAB final report, the TAB specialist shall permanently mark the setting of all HVAC adjustment devices, including valves, splitters, and dampers, so that the Owner can restore the adjustment if disturbed. TAB specialist shall identify and permanently and legibly mark locations of duct test ports. If the ductwork has exterior insulation, the TAB specialist shall make the test port identification on the exterior side of the insulation.

d. Test equipment and instruments shall meet the accuracy/calibration requirements of the instrument manufacturer and those established by AABC National Standards or by the NEBB Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems. The Consultant must maintain calibration history of the instruments to be used for test and balance purposes.

e. Before starting TAB work pursuant to a purchase order, the Consultant shall obtain from the owner applicable construction and design documents and approved construction submittals for HVAC equipment and control systems as may be available. shall plan and perform TAB services and prepare and submit required reports as provided in applicable AABC or NEBB publications and ASHRAE Handbook "HVAC Applications", 2011 Edition.

f. TAB flow rate tolerances - The following tolerances are allowed:

1. Air handling unit and all other fans, cubic meters/min (cubic feet per minute): Minus 0 percent to plus 10 percent.
2. Air terminal units (maximum values): Minus 10 percent to plus 10 percent.
3. Minimum outside air: 0 percent to plus 10 percent.

4. Individual room air outlets and inlets, and air flow rates not mentioned above: Minus 10 percent to plus 10 percent.
5. Heating hot water pumps and hot water coils: Minus 5 percent to plus 5 10 percent.
6. Chilled water and condenser water pumps: Minus 0 percent to plus 5 10 percent.
7. Chilled water coils: Minus 0 percent to plus 10 percent.

Consultants shall follow ASHRAE Handbook "HVAC Applications Chapter 38", 2011 Edition, as a guide for flow rate tolerances not set forth above.

g. As required by the Owner, the Consultant shall adjust systems for energy efficient operation. If required by the Owner, the Consultant, upon beginning fieldwork, shall demonstrate TAB procedures and results for air distribution systems (including fans, terminal units) in rooms selected by the Owner and also for hydronic systems (pumps and coils) selected by the Owner.

h. The following publications form a part of the Consultant's performance specifications:

1. AABC certified Consultant:

- i. ASHRAE Handbook "HVAC Applications", 2011 Edition, Chapter 38- Testing, Adjusting, and Balancing
- ii. AABC National Standards for Total System Balance
- iii. Sheet Metal and Air Conditioning s National Association (SMACNA) "HVAC SYSTEMS - Testing, Adjusting and Balancing", 2002 Edition.

2. NEBB certified Consultant:

- i. ASHRAE Handbook "HVAC Applications", 2011 Edition, Chapter 38- Testing, Adjusting, and Balancing
- ii. NEBB Standards:
  - Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems
  - Procedural Standards for the Measurement of Sound and Vibration
  - Procedural Standards for Whole Building Systems - Commissioning of New Construction
- iii. Sheet Metal and Air Conditioning s National Association (SMACNA) "HVAC SYSTEMS - Testing, Adjusting and Balancing", 2002 Edition.

If the Consultant is certified by both AABC and NEBB, the Consultant shall follow the standards agreed on by the owner.

i. Procedures:

1. General: During TAB, all related system components shall be in full operation. Consultant shall check fan and pump rotation, motor loads and equipment vibration as necessary before proceeding with TAB. Consultant shall set controls and/or block off parts of distribution systems to simulate design operation of variable volume air or water systems

for test and balance work. Consultant shall coordinate TAB procedures with Controls for new and existing systems.

2. Air Balance and Equipment Test: As required by the purchase order, Consultant shall Test, Adjust, and Balance air handling units, fans, terminal units, fan coil units, room diffusers, outlets, inlets, and computer room air conditioning (AC) units. Consultant shall:
  - i. Artificially load air filters by partial blanking to produce air pressure drop of manufacturer's recommended pressure drop;
  - ii. Adjust fan speeds to provide design airflow. Provide sizing for V-belt drives, including fixed pitch pulley requirements to the installing;
  - iii. Test and balance systems in all specified modes of operation, including variable volume, economizer, and fire emergency modes;
  - iv. Verify that dampers and other controls function properly;
  - v. For variable air volume (VAV) systems:
    - a. Coordinate TAB, including system volumetric controls;
    - b. Check and readjust Air Terminal Unit (ATU) flow rates as necessary (maximum and minimum flow rates for air terminal units (ATU) are factory set):
      1. Balance air distribution from ATU on full cooling maximum scheduled cubic feet per minute CFM; (cubic meters per minute)
      2. Reset room thermostats and check ATU operation from maximum to minimum cooling, to the heating mode, and back to cooling;
      3. Record and report the heating coil leaving air temperature when the ATU is in the maximum heating mode;
      4. Record and report outdoor air flow rates under all operating conditions (the test shall demonstrate that the minimum outdoor air ventilation rate remains constant under all operating conditions); and
      5. Adjust operating pressure control setpoint to maintain the design flow to each space with the lowest allowable setpoint;
  - iv. Record final measurements for air handling equipment on appropriate performance data sheets.
3. Water Balance and Equipment Test: As required by purchase order, Consultant shall Test, Adjust, and Balance circulating pumps, convertors, coils, coolers, and condensers. shall:
  - i. Adjust flow rates for equipment;
  - ii. Set coils and evaporators to values on as built drawings;
  - iii. For primary-secondary (variable volume) systems, coordinate TAB with Controls to verify water flow at maximum flow and then verify that variable flow controls function as designed;

- iv. Record final measurements for hydronic equipment on appropriate performance data sheets. Include entering and leaving water temperatures for heating and cooling coils, and for convertors. Include entering and leaving air temperatures (DB/WB for cooling coils) for air handling units and reheat coils. Make air and water temperature measurements at the same time.
4. Vibration Testing: As required by purchase order, Consultant shall perform vibration measurements for all rotating HVAC equipment of 373 watts (1/2 horsepower) and larger, including centrifugal/screw compressors, cooling towers, pumps, fans and motors. Consultant shall record initial measurements for each unit of equipment on test forms and submit a report to the Owner. Where vibration readings exceed the allowable tolerance the Consultant shall notify the Owner.
5. Sound Testing: As required by purchase order, Consultant shall perform and record sound measurements as follows:
- Take readings in required rooms as required by purchase order; and
  - Provide cooling tower sound measurements.

Consultant shall take measurements with a calibrated sound level meter and octave band analyzer of the accuracy required by AABC or NEBB. Sound reference levels, formulas, and coefficients shall be according to ASHRAE Handbook, "HVAC Applications", 2011 Edition, Chapter 48 – Noise and Vibration Control. Consultant shall notify Owner where measured sound levels exceed specified levels. Consultant shall determine compliance with specifications as follows:

- i. When sound pressure levels are specified:
- a. Reduce the background noise as much as possible by shutting off unrelated audible equipment.
  - b. Measure octave band sound pressure levels with specified equipment "off."
  - c. Measure octave band sound pressure levels with specified equipment "on."
  - d. Use the DIFFERENCE in corresponding readings to determine the sound pressure due to equipment.

DIFFERENCE:	0	1	2	3	4	5 to 9	10 or More
FACTOR:	10	7	4	3	2	1	0

Sound pressure level due to equipment equals sound pressure level with equipment "on" minus FACTOR.

- e. Plot octave bands of sound pressure level due to equipment for typical rooms on a graph that also shows noise criteria (NC) curves.
- ii. When sound power levels are specified:
- a. Perform steps (i)(a) thru (i)(d). above.



- b. For indoor equipment: Determine room attenuating effect, i.e., difference between sound power level and sound pressure level. Determined sound power level will be the sum of sound pressure level due to equipment plus the room attenuating effect.
  - c. For outdoor equipment: Use directivity factor and distance from noise source to determine distance factor, i.e., difference between sound power level and sound pressure level. Measured sound power level will be the sum of sound pressure level due to equipment plus the distance factor. Use 10 meters (30 feet) for sound level location.
- iii. Where sound pressure levels are specified in terms of dB(A), measure sound levels using the "A" scale of meter. Single value readings will be used instead of octave band analysis.

j. Reports

1. System Review Report: Consultant shall report deficiencies that would prevent the HVAC systems from effectively operating in accordance with the required sequence of operation or prevent the effective and accurate TAB for an HVAC system. The Consultant shall provide a report individually listing each deficiency and the corresponding recommended corrective action necessary for proper system operation.
2. System Inspection Report: When required by purchase order, Consultant shall inspect HVAC systems, equipment and installation for conformance with available equipment and design data and Verify that diffusers, register, ducts, piping, and other system components are sized properly and are correctly routed. Consultant shall issue a report on results of inspection using a checklist format developed by AABC or NEBB, supplemented by narrative comments explaining specific deficiencies and recommended corrective actions as appropriate.
3. Duct Air Leakage Test Report: When required by purchase order, Consultant shall witness and document duct leakage test and submit reports in accordance with and on AABC or NEBB standards and forms.
4. System Readiness Report: In coordination with the Owner, the Consultant shall measure existing air and water flow rates associated with existing systems utilized to serve areas as indicated on construction drawings and available design data. Consultant shall inspect each System to ensure that it is complete including installation and operation of controls. Consultant shall verify that all items such as ductwork and piping, ports, terminals, connectors, etc., that are required for TAB, are installed. Consultant shall submit a report of findings including all deficiencies to the Owner.
5. TAB Reports: Consultant shall provide raw data immediately in writing to the Owner if there is a problem in achieving intended results before submitting a formal report. If, during verification, over 10 percent of readings in the report fall outside the



acceptable range, the TAB report shall be considered invalid and all TAB work provided for in the purchase order shall be repeated and re-submitted for approval at no additional cost to the owner.

k. Repairs: Consultant shall seal all penetrations through ductwork and ductwork insulation to prevent air leaks and maintain the vapor barrier integrity. Consultant shall seal holes drilled in ductwork for test purposes using plastic plugs manufactured for such use. Consultant shall repair insulation removed or damaged by TAB work using as approved by the Owner and comparable to materials and methods as existing adjacent work

## **MISCELANEOUS**

a. Safety: The Consultant shall ensure that all employees and Sub-Consultants are aware of and comply with safety requirements including applicable federal and state OSHA standards before arriving on site. 's employees and Sub-Consultants shall wear appropriate OSHA required personal protection equipment at all times during the performance of the work.

b. Site Access: The Consultant and the Consultant's sub-consultants shall comply with any project site-specific security clearance requirements. When entering or on the site of the project, the Consultant and its employees and sub-consultants, upon request, shall show proper identification to the construction.

This contract does not extend to the services performed by Architects, Engineers, surveyors, etc. and cannot be used to engage professional services.

TAB consists of work elements as are included, but not limited to, items listed in the specification. Ancillary work not specifically listed but incidental to TAB may be included, subject to compliance with these specifications and at an agreed upon cost to the Agency.

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**[Click Here to View Contract Awards](#)**

**Contract Number:** 4400005307

**Awarded To:** CAROLINA AIR & WATER BALANCING CO. INC

**Address:** 1051 OLD GARNERS FERRY ROAD  
COLUMBIA SC 29209

**Contact:** Wilbert Goff

**Email:** [ann@cawbi.com](mailto:ann@cawbi.com)

**Telephone:** (803) 776-0568

**Fax:** (803) 776-6617

**Vendor Number:** 7000033375

<b>Item</b>	<b>Description</b>	<b>Hourly Price</b>
00010	TAB MANAGER	\$ 85.00
00020	TAB TECHNICIAN	\$ 65.00
00030	TAB TECHNICAL ASSISTANT	\$ 45.00
00040	CLERICAL	\$ 45.00

**Contract Number:** 4400005308

**Awarded To:** HALL TECHNOLOGY INC

**Address:** 239 CHARTER OAK ROAD  
LEXINGTON SC 29072

**Contact:** Sylvia Stone or Wayne Hall

**Email:** [Sylvia@halltechnologyinc.com](mailto:Sylvia@halltechnologyinc.com)

**Telephone:** (803) 808-2963

**Fax:** (803) 256-2648

**Vendor Number:** 7000083339

<b>Item</b>	<b>Description</b>	<b>Hourly Price</b>
00010	TAB MANAGER	\$ 80.00
00020	TAB TECHNICIAN	\$ 62.00
00030	TAB TECHNICAL ASSISTANT	\$ 38.00
00040	CLERICAL	\$ 40.00

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**Contract Number:** 4400005309  
**Awarded To:** KLG JONES LLC  
**Address:** 350 FARM LAKE ROAD  
SPARTANBURG SC 29316  
**Contact:** Barry Jones  
**Email:** [bjones@klgjones.com](mailto:bjones@klgjones.com)  
**Telephone:** (864) 848-6116  
**Fax:** (864) 848-6411  
**Vendor Number:** 7000129905

Item	Description	Hourly Price
00010	TAB MANAGER	\$ 85.00
00020	TAB TECHNICIAN	\$ 65.00
00030	TAB TECHNICAL ASSISTANT	\$ 45.00
00040	CLERICAL	\$ 45.00

**Contract Number:** 4400005310  
**Awarded To:** PALMETTO AIR & WATER BALANCE INC  
**Address:** PO Box 5782  
GREER SC 29606-5782  
**Minority Status:** White Female  
**Contact:** Angela Elders  
**Email:** [aelders@palmettoairbalance.com](mailto:aelders@palmettoairbalance.com)  
**Telephone:** (864) 877-6832  
**Fax:** (864) 877-5490  
**Vendor Number:** 7000077396

Item	Description	Hourly Price
00010	TAB MANAGER	\$ 85.00
00020	TAB TECHNICIAN	\$ 65.00
00030	TAB TECHNICAL ASSISTANT	\$ 45.00
00040	CLERICAL	\$ 45.00